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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

In the Matter of)
)
An Allocation of Spectrum for the) RM-9267
Private Mobile Radio Services)

COMMENTS OF AERONAUTICAL RADIO, INC.

Aeronautical Radio, Inc. ("ARINC"), hereby submits comments on the petition of rulemaking submitted by the Land Mobile Communications Council ("LMCC") on April 22, 1998.¹

ARINC is the communications company of the air transport industry and has long represented the interests of that industry in the effective use of spectrum to promote the safety and efficiency of aviation. ARINC and its Aeronautical Frequency Committee ("AFC") deal with both the aeronautical and land mobile needs of aviation and have carefully documented that aviation needs additional spectrum resources for private land mobile systems in the vicinity of the nation's airports.² ARINC supports LMCC's call for additional land mobile spectrum, but this need for additional private and mobile capacity cannot come at the expense of present and

¹ Public Notice was given of the LMCC Petition April 30, 1998 (Report No. 2272).

² See SkyComm, Inc., Private Land Mobile Communications Requirements of Passenger and Freight Air Carriers at Airports, September 30, 1996.

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future aviation safety systems, such as those now using and those planned for the band 960-1215 MHz.³

LMCC's Petition should be granted and an inquiry into spectrum for private land mobile systems initiated, but its suggestion that the Commission reallocate a substantial portion of the aeronautical radionavigation band 960-1215 MHz should be denied. The needs of the land mobile community should be met in other bands.

The band 960-1215 MHz is allocated exclusively to the aeronautical radionavigation service throughout the world. It is used by aviation as the common frequency band for important navigation aids and will continue to be used for these safety functions for the foreseeable future. LMCC's hopes that the Global Navigation Satellite System (GNSS) of the International Civil Aviation Organization (ICAO) will provide a suitable alternative to these navigation systems in the near future is, at best, premature. While there has been optimistic predictions about the ability of aviation to reduce, or even eliminate its reliance on some of the navigation systems in this band, the simple fact is that even were there consensus that United States could begin to phase out these radionavigation systems—which consensus does not exist today—a transition out of this band could not be accomplished by the year 2010. Moreover, this band is an important resource for new worldwide aviation systems that will further enhance the safety and efficiency of flight.

³ ARINC does not object, however, to the proposal to use the band 1390-1400 MHz, currently used for Air Route Surveillance Radar (ARSR).

Protection of aviation navigation systems is clearly in the public interest. The U.S. air transport industry is a vital part of our nation's economy. People and cargo are quickly and efficiently moved about the country and overseas to facilitate U.S. industry. In fiscal 1997, 595 million passengers boarded scheduled air carriers in the United States.⁴ The FAA and the FCC should ensure that the air navigation system in the United States has the resources to accommodate this growth and avoid future gridlock in the air. Systems using the aeronautical radionavigation band 960-1215 MHz will continue to be an important part of the aviation infrastructure for the foreseeable future, and thus should not be considered for reallocation to land mobile.

This aeronautical radionavigation band is especially important because of the systems currently using the band and its potential for future aviation facilities. ICAO, in its *Handbook on Radio Frequency Spectrum Requirements for Civil Aviation*, published last year, describes the following civilian navigation systems that currently operate in this band:⁵

- **Distance Messaging Equipment (DME)**

DME is the ICAO Standard system for the determination of ranges within radio line of sight, using pulse techniques and time measurement. DME/N is the standard system used for en-route and terminal navigation, either co-located with VHF omnidirectional radio range (VOR), or with two DMEs and the flight management system (FMS) equipment in the aircraft. DME/P is a precision version with an enhanced measurement capability which may be used in conjunction with ILS or expanded

⁴ FAA, Aviation Forecasts Fiscal Years 1998-2009 at IX-14.

⁵ ICAO, *Handbook on Radio Frequency Spectrum Requirements for Civil Aviation* 7-II-[62]-[63] (1997).

MLS, as well as with MLS, to provide accurate distance to touch down. Tacan is the military equivalent and also has a bearing capability, using the same channel plan as DME.

The channel plan (Annex 10, Volume I, Chapter 3, Table A) employs discrimination in both pulse length and pulse spacing, generating four possible modes. X, Y, W, Z, as a means of creating additional channels.

- **Secondary Surveillance Radar (SSR)**

SSR is an ICAO Standard system employing secondary radar principles, used either by itself, or co-located and synchronized with primary radar. The aircraft equipment is a transponder employing Mode A for identity and Mode C for pressure-altitude information. Mode S employs selective addressing and has a limited data link capability. SSR Mode S is a continuing requirement, in particular in high density airspace.

All SSR installations operate on 1 030 MHz for the ground-air interrogation signal, and 1 090 MHz for the air-ground reply. Extensive use of pulse repetition frequency (PRF) discrimination and plot plan processing techniques assists in reducing the number of validated responses received by the ground receiving system.

- **Airborne Collision Avoidance System (ACAS)**

ACAS is an ICAO Standard system for detection and avoidance of airborne conflict situations. ACAS operates as a supplementary system to SSR using the same frequency pair of 1 030 MHz and 1 090 MHz. 1 030 MHz is used for the air-to-air interrogation and 1 090 MHz for the air-to-air reply. The three modes, I, II and III, provide increased capability at each level of functional implementation. Provision is made for air-ground communication with ground stations using the Mode S data link.

Commentary: The present internationally agreed channel plans occupy the full band 960-1215 MHz. Some world areas are prone to congestion. Double frequency linking with VOR and triple frequency linking of DME with instrument landing system (ILS) and with microwave landing system (MLS), a necessary operational technique for air safety, or for the transition to MLS where this system is brought into use, and co-channel Tacan use, are factors often creating difficulties in frequency planning which are not easily overcome.

Several independent factors will influence the future use of the band for civil aviation purposes. GNSS is projected as a long-term future replacement for some current navigational requirements, either in sole use or support forms. In some continental airspaces, VOR/DME could be replaced by GNSS, or supplemented by the use of area navigation based on DME/DME. The latter system, where it becomes established in sole use form, is likely to extend beyond the year 2015.

The use of DME/P will provide essential support to higher Category ILS and MLS operations. Present expectations are that no Category III operations other than with ILS or MLS are foreseen in the period up to and beyond the year 2015.

SSR and SSR Mode S are the main technique for surveillance in high traffic density areas (FANS II/4 refers). ACAS is an airborne system using SSR transponder (reply) signals (Annex 10, Volume IV, Chapter 4 refers)

SSR Mode S is a tool for air traffic management in some important high density continental airspaces.

Carriage of ACAS systems may be mandatory in some airspace by national regulation or by regional agreement.

The over-all situation in this band is one of a continuing exploitation of current systems, with the possibility of some transfer to GNSS, perhaps relatively slowly at first, only intensifying when GNSS is fully proven as a sole means navigational system. However, the realistic probability is that some important uses of the band, such as DME/DME, DME/P with MLS, and SSR Mode S, will continue as the main ATS tool in high density airspace well beyond 2015, and will be only slowly reduced after that date.

These existing systems identified in the ICAO Handbook are expected to be in use “well beyond 2015” and enhancements to these systems and new navigation facilities may also find a home in this important navigation resource. The allocation is important to aviation for future systems because it is uniform and exclusive in all three regions of the International

Telecommunication Union (ITU). No other service is authorized in this band in the ITU Radio Regulations, and the only ITU footnote to the allocation (S5.328 (709)) states flatly that:

The band 960-1215 MHz is reserved on a worldwide basis for the use and development of airborne electronic aids to navigation and any directly associated ground-based facilities.

Aviation systems are uniquely dependent upon uniform allocations worldwide. Aircraft must be able to operate anywhere in the world. Plans are in the works for an additional GPS channel that may require these frequencies, and DME/P described in the ICAO Handbook is being deployed in this band, at least in some countries, and thus U.S. aviation will be have to support these systems. New collision avoidance and radiobeacon systems may also be required to support free flight and increase the capacity of the national airspace. The FCC should not, at this time, take any action to prejudice these needed improvements in aviation navigation and safety.

LMCC's view that the band 960-1215 MHz might become available seems to be based on an incomplete reading of the RTCA SC-185 Report entitled *Aeronautical Spectrum Planning for 1997-2010*.⁶ While it is true that the RTCA Report observes that "Aviation navigation is currently migrating from ground-based systems to satellite-based systems,"⁷ LMCC overlooks the finding of the RTCA that the "TACAN/DME spectrum requirements will remain constant throughout that period," *i.e.*, the study period 1997-2010.⁸ The RTCA Report says little about use of this spectrum after 2010, except to note that VOR, which is usually paired with DME,

⁶ RTCA, *Aeronautical Spectrum Planning for 1997-2010*, DO-237 (January 27, 1997).

⁷ *Id.* at 24; *see* LMCC Petition at 34.

⁸ RTCA, *Spectrum Planning Report* at 24.

may be required in the post-2010 time frame⁹ and that the band may be needed for GNSS augmentation,¹⁰ and to recommend that the band be retained for current and future aeronautical safety-critical navigation and surveillance applications."¹¹ The other systems listed in the ICAO Handbook and RTCA Report will also continue well beyond the year 2010.

Moreover, neither GNSS nor GPS has yet to be approved as the sole means of aeronautical navigation in the United States, let alone any other part of the world. Even when GNSS is approved as a sole means for navigation, it will not be the *only* means of navigation utilized and supported in the United States. The United States, and other countries, will be required to maintain ground-based navigation systems for the foreseeable future to meet the needs of U.S. and foreign aircraft that are not equipped for GNSS.

Once a consensus is reached in the United States to migrate to a new system, such a transition may not be imposed unilaterally in the rest of the world. Before a new radionavigation system is implemented to support civil aviation, ICAO must establish validated Standards and Recommended Practices (SARPS). Based on these SARPs, a consensus of airspace users and civil aviation administrations must agree to a implementation plan, and then airplanes must be equipped with the new system. This process, which is in its early stages as to GNSS, will take at least a decade to accomplish.

⁹ *Id.*

¹⁰ *Id.* at 57.

¹¹ *Id.* at 72.

Even after the U.S. airline industry has completed this transition, there will be a continuing need for DME to support unequipped aircraft operated by some small air carriers, some foreign airlines, and some small aircraft operators well into the next century. There may come a time when land based radionavigation facilities may be discontinued or decommissioned but there is no generally accepted schedule for such decommissioning at this time and no worldwide consensus that such decommissioning is even appropriate. Optimistic projections may have been made, but these projections must be considered unrealistic at this time.

Since the completion of the RTCA Report and preliminary plans by the FAA to increase reliance in GPS as a sole means of navigation, questions have been raised about GPS's vulnerability to intentional interference or interference from land mobile and mobile satellite systems. While we are confident that these issues can be resolved favorably to GNSS, the fact that the questions continue could delay the start of any transition to GNSS as a sole means of navigation.

LMCC also tries to draw some conclusion from the presence of the Joint Tactical Information Distribution Systems (JTIDS) in this band.¹² JTIDS is a frequency hopping, spread spectrum system operated by the United States military on a strictly non-interference basis.¹³ The Department of Defense has invested a significant amount of time and money, working with the FAA, to ensure compatibility with aeronautical radionavigation systems in the band. The presence of a single carefully controlled user in this band is significantly different from LMCC's

¹² LMCC Petition at 34.

¹³ See Aeronautical Radionavigation Service, 71 F.C.C.2d 12 (1979).

requirements, which would involve thousands of individual land mobile users with diverse needs, patterns of operations, equipment types, and levels of sophistication. The limited presence of JTIDS does not support a wholesale reallocation.

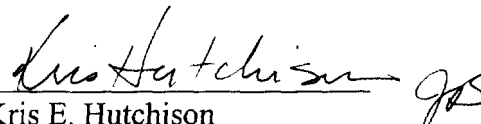
ARINC is not unsympathetic to the needs of the private mobile radio community at large and is keenly aware of the needs of aviation industry of airports for additional wireless resources. Nevertheless, we believe that it would be inappropriate and contrary to the interests of the United States for the FCC to propose any reduction in the worldwide allocation for aeronautical radionavigation systems in the band 960-1215 MHz.

Respectfully submitted,

AERONAUTICAL RADIO, INC.

John C. Smith, Esq.
General Counsel
ARINC Incorporated
2551 Riva Road
Annapolis, Maryland 21401

Of Counsel

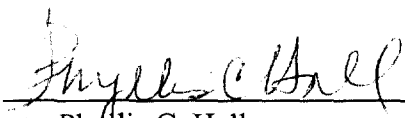
By: 
Kris E. Hutchison
Director of Frequency Management
Aeronautical Radio, Inc.
2551 Riva Road
Annapolis, Maryland 21401

June 1, 1998

CERTIFICATE OF SERVICE

I hereby certify that on this 1st day of June, 1998, I caused copies of the foregoing
"Comments of Aeronautical Radio, Inc.," to be mailed via first-class postage prepaid mail to the
following:

Larry A. Miller
Land Mobile Communications Council
1110 North Glebe Road, Suite 500
Arlington, VA 22201-5720



Phyllis C. Hall